

formed, and the third connection terminal 32, the fourth connection terminal 33 and the erroneous insertion prevention plug 49 are provided within the storage concave part 31g so as to project.

[0068] FIG. 17 is a schematic circuit diagram illustrating a configuration of the surge protective system in FIG. 1 according to the first embodiment of the present invention. FIG. 17 illustrates a juncture state of the two SPDs 1-1 and 1-2 out of the three SPDs 1-1, 1-2 and 1-3 and one power supply unit 50.

[0069] Each of the SPDs 1-1, 1-2 and 1-3 has the same circuit configuration. The SPD 1-1 includes the SPD side jack 10, and the SPD side plug 30 detachably attached by insertion to the SPD side jack 10.

[0070] The SPD side jack 10 has the case 11, and the two external line side terminals 12-1 and 12-2, the two equipment side terminals 13-1 and 13-2, the two earth terminals 14-1 and 14-2, the two juncture terminals 15-1 and 15-2, one first connection terminal 16 and one second connection terminal 17 are attached to this case 11. The juncture terminal 15-1 has the three terminal parts 15-1(1), 15-1(2) and 15-1(3). In a similar manner, the juncture terminal 15-2 has the three terminal parts 15-2(1), 15-2(2) and 15-2(3), and the first connection terminal 16 has the three terminal parts 16(1), 16(2) and 16(3). The terminal parts 15-1(1), 15-1(2) and 15-1(3) of the juncture terminal 15-1, the terminal parts 15-2(1), 15-2(2) and 15-2(3) of the juncture terminal 15-2, and the terminal parts 16(1), 16(2) and 16(3) of the first connection terminal 16 are connected in parallel. The pair of external line side lines 2-1 is connected to the two external line side terminals 12-1 and 12-2. The pair of equipment side lines 3-1 is connected to the two equipment side terminals 13-1 and 13-2. Out of the two earth terminals 14-1 and 14-2, for example, one earth terminal 14-2 is grounded.

[0071] The SPD side plug 30 has the case 31, and one third connection terminal 32 and one fourth connection terminal 33 are attached to this case 31. The third connection terminal 32 is detachably connected to the jack side first connection terminal 16. The fourth connection terminal 33 is detachably connected to the jack side second connection terminal 17. Within the case 31, the protection circuit 34, the degradation detecting unit 40, switching means (for example, a transistor) 44, the display unit 45, or the like, are provided.

[0072] The protection circuit 34 is a circuit which is connected to the fourth connection terminal 33 and the earth terminal 14-2, and which discharges lightning surge intruding from the external line side terminals 12-1 and 12-2 or the equipment side terminals 13-1 and 13-2 through the second connection terminal 17 and the fourth connection terminal 33 to the earth terminal 14-2 side to protect the equipment to be protected. This protection circuit 34 is configured with a lightning protection element such as an arrester which is a lightning protection tube and a varistor which is a non-linear resistive element. The lightning protection element loses its protection function when the element degrades as the number of times of operation, or the like, by lightning surge increases. Therefore, the degradation detecting unit 40 for detecting a degradation state of the lightning protection element is provided.

[0073] The degradation detecting unit 40 detects a lightning surge current flowing between the protection circuit 34 and the earth terminal 14-2 and detects the degradation state of the protection circuit 34 by comparing a history of this

lightning surge (such as, for example, a degree of the lightning surge and the number of times of intrusion of the lightning surge) with a reference value. This degradation detecting unit 40 has a control circuit (for example, a central processing unit, hereinafter, referred to as a "CPU") 41 having an operation/control function, a memory 42 which is accessed by this CPU 41 and in which the history, or the like, of the lightning surge is stored, detecting means (for example, a current transformer, hereinafter, referred to as a "CT") 43 which detects lightning surge flowing from the protection circuit 34 to the earth terminal 14-2 side and provides this detection signal to the CPU 41, or the like.

[0074] The transistor 44 is connected between the two terminal parts 16(2) and 16(3) of the jack side first connection terminal 16 through the third connection terminal 32, put into an on state by a control signal of the CPU 41, and has a function of making the two terminal parts 16(2) and 16(3) conductive.

[0075] The display unit 45 is connected to the CPU 41 within the degradation detecting unit 40 and displays a detection result, or the like, of the degradation detecting unit 40, and is configured with, for example, the green LED 45a which displays a normal state, the yellow LED 45b which displays a replacement recommendation state, the red LED 45c which displays a degradation (failure) state and the LED 45d for displaying a remaining battery level. It should be noted that because the LED 45d for displaying the remaining battery level and the switch 46 disposed in the vicinity of the display unit 45 illustrated in FIG. 2 are not used in the first embodiment, the LED 45d and the switch 46 are not connected to the CPU 41.

[0076] The power supply unit 50 has the same outer shape as that of the SPD 1-1, and includes the power supply unit side jack 60, and the power supply unit side plug 70 which is detachably attached by insertion to this power supply unit side jack 60.

[0077] The power supply unit side jack 60 has a case, and terminals such as two power supply terminals 62-1 and 62-2, two contact output terminals 63-1 and 63-2, two earth terminals 64-1 and 64-2, two juncture terminals 65-1 and 65-2 and one first connection terminal 66 are attached to this case. While the juncture terminal 65-1 has three terminal parts, because the terminal parts are not used in the first embodiment, the terminal parts are not connected to other terminals. The juncture terminal 65-2 has the three terminal parts 65-2(1), 65-2(2) and 65-2(3). In a similar manner, the first connection terminal 66 has three terminal parts 66(1), 66(2) and 66(3). The terminal parts 65-2(1), 65-2(2) and 65-2(3) of the juncture terminal 65-2 and the terminal parts 66(1), 66(2) and 66(3) of the first connection terminal 66 are connected in series. The power supply terminal 62-1 is connected to a 0-V terminal of the external power supply 5, and the power supply terminal 62-2 is connected to +24-V terminal of the external power supply 5. The pair of contact output signal lines 6 is connected to the two contact output terminals 63-1 and 63-2. For example, the earth terminal 64-2 is connected to the power supply terminal 62-1 and grounded.

[0078] The power supply unit side plug 70 has a case, and is detachably connected to the power supply terminals 62-1 and 62-2 of the power supply unit side jack 60, the first connection terminal 66, the contact output terminals 63-1 and 63-2 and the earth terminal 64-2 through the terminals attached to this case. Inside the case of the power supply unit